

CLAIMS

What is claimed is:

- 5        1. A method for use by a switch in a storage network, the method comprising:  
             automatically obtaining information about performance characteristics of  
             a physical device in communication with the switch, wherein the physical  
             device includes one or more logical units (LUs); and  
             based on the performance characteristics, assigning the LUs for the  
10        physical device to a storage pool.
2. The method of claim 1, further including classifying the LUs according to a  
             policy based on the performance characteristics.
- 15        3. The method of claim 1, further including classifying the LUs according to a  
             policy based on the performance characteristics, wherein the storage pool is  
             defined by the policy.
4. The method of claim 1, further including:  
20        provisioning a virtual target using the LUs in the storage pool.
5. The method of claim 1, further including:  
             provisioning a virtual target using the LUs in the storage pool, wherein  
             the virtual target is provisioned in accordance with user-selected criteria.  
25        6. The method of claim 1, further including:  
             storing an LU object in the switch for each LU, wherein the LU object  
             includes information about the LU.

7. The method of claim 1, wherein the storage pool is defined by a listing of the LUs.

8. The method of claim 1, further including automatically discovering the physical device when it is placed in communication with the switch.

9. A method for use by a switch in a storage network, the method comprising:  
automatically obtaining information about performance characteristics of a plurality of physical devices in communication with the switch, wherein each physical device includes one or more logical units (LUs);  
based on the performance characteristics of each physical device, classifying the respective LUs according to a respective one of a plurality of policies and assigning the LUs for each respective physical device to a respective one of a plurality of storage pools;

provisioning a virtual target using the LUs assigned to a selected storage pool.

10. The method of claim 9, wherein each respective storage pool is defined by a respective policy.

11. The method of claim 9, wherein the virtual target is provisioned in accordance with user-selected criteria.

12. The method of claim 9, further including:

storing an LU object in the switch for each LU, wherein the LU object includes information about the LU.

13. The method of claim 9, wherein each respective storage pool is defined by a listing of the respective LUs assigned to it.

14. The method of claim 9, wherein each respective storage pool is defined by a respective policy and wherein the respective policy encompasses the performance characteristics of the LUs assigned to the respective storage pool.

5 15. The method of claim 9, further including automatically discovering each of the plurality of physical devices when each physical device is placed in communication with the switch.

10 16. The method of claim 9, further including associating the virtual target with a user domain.

15 17. The method of claim 9, further including associating the virtual target with a user domain, wherein the user domain is also associated with a second virtual target provisioned by a second switch.

18. A method for use by a switch in a storage network, the method comprising:  
receiving a request from a user for a virtual target, wherein the request includes a size of the virtual target and a storage pool from which to provision the virtual target;  
automatically determining if storage resources assigned to the storage pool are available that meet the size specified;  
if the storage resources are available, provisioning the virtual target.

25 19. The method of claim 18, wherein the storage resources are at least portions of logical units (LUs).

30 20. The method of claim 18, wherein the storage pool is defined by a policy and wherein all of the storage resources assigned to the pool are encompassed by the policy.

21. The method of claim 20, wherein the storage resources are assigned to the storage pool without user intervention.

5 22. The method of claim 18, wherein the request further includes a desired availability of the virtual target, and wherein provisioning a virtual target further includes provisioning a virtual target with the desired availability.

10 23. The method of claim 18, further including provisioning an initiator connection from an initiator to the virtual target.

24. The method of claim 18, further including associating the virtual target with a user domain.

15 25. The method of claim 18, further including associating the virtual target with a user domain, wherein the user domain is also associated with a second virtual target provisioned by a second switch.

20 26. A method for use by a switch in a storage network, the method comprising:  
creating a Quality of Service policy for storage access for a connection  
from an initiator to a virtual target in a storage network, including:  
provisioning a virtual target in accordance with a first set of  
specified parameters; and  
provisioning an initiator connection in accordance with a second  
set of specified parameters.

25 27. The method of claim 26, wherein creating further includes associating the virtual target with a user domain accessible by the initiator.

28. The method of claim 26, wherein provisioning a virtual target includes using resources from a storage pool wherein the resources are classified by a policy and the storage pool is accessible to a selected set of connections.

- 5        29.     A method for use in a storage network, the method comprising:  
             provisioning, by a first switch, a first virtual target using storage  
             resources in communication with the first switch;  
             provisioning, by a second switch, a second virtual target using storage  
             resources in communication with the second switch;  
10            associating the first virtual target with a user domain accessible by an  
             initiator in communication with the first switch;  
             associating the second virtual target with the user domain so that the  
             second virtual target is also accessible by the initiator.

- 15        30. The method of claim 29, wherein the step of associating the second virtual  
             target with the user domain includes provisioning an initiator connection from  
             the first switch to the second switch.

- 20        31. A method for use by a switch in a storage network, the method comprising:  
             automatically discovering each of a plurality of physical devices in  
             communication with the switch and obtaining information about performance  
             characteristics of each physical device, wherein each physical device includes  
             one or more logical units (LUs);  
             based on the performance characteristics of each physical device,  
25        classifying the respective LUs according to a respective one of a plurality of  
             policies and assigning the LUs for each respective physical device to a  
             respective one of a plurality of storage pools;  
             receiving a request for a virtual target, wherein the request includes the  
             size of the virtual target and a selected storage pool from which to provision the  
30        virtual target;

determining if storage resources assigned to the storage pool are available that meet the size specified;

if the storage resources are available, provisioning the virtual target;

receiving a request for a connection from an initiator to the virtual target,

5 wherein the request includes a minimum bandwidth; and  
provisioning the connection.

32. The method of claim 31, wherein provisioning the connection includes storing information about the connection.

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33. The method of claim 31, further including associating the virtual target with a user domain accessible by the initiator.

34. A switch for use in a storage network, comprising:

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means for automatically obtaining information about performance characteristics of a plurality of physical devices in communication with the switch, wherein each physical device includes one or more logical units (LUs);

means for assigning the LUs for each respective physical device to a respective one of a plurality of storage pools based on the performance  
20 characteristics of each physical device.

35. The switch of claim 34, further including:

means for provisioning a virtual target using LUs assigned to a selected storage pool.

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36. The switch of claim 35, further including:

means for provisioning an initiator connection from an initiator to the virtual target.

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37. A switch for use in a storage network, comprising:

a utility program designed to automatically obtain information about performance characteristics of a plurality of physical devices in communication with the switch, wherein each physical device includes one or more logical units (LUs), wherein the utility program is further designed to assign the LUs for each respective physical device to a respective one of a plurality of storage pools based on the performance characteristics of each physical device;

a database in communication with the utility program including a plurality of LU objects, wherein each LU object includes at least some of the information obtained by the utility program and wherein the database further includes a storage pool object for each respective storage pool, wherein the storage pool object includes a listing of the LUs in the respective storage pool.

38. The switch of claim 37, wherein the utility program further is designed to classify the LUs of each physical device according to one of a plurality of policies.

39. The switch of claim 37, wherein the utility program is further designed to automatically discover each physical device at when the physical device is placed in communication with the switch.

40. The switch of claim 37, wherein the database further includes a plurality of virtual target objects wherein each virtual target object includes a listing of extent objects identifying the extents that form a particular virtual target.

41. The switch of claim 37, wherein the database further includes a user domain object including a listing of virtual targets that belong to the user domain.

42. A storage network, comprising:

a first switch, having one or more physical devices in communication with it and one or more initiators in communication with it, wherein each physical device includes one or more logical units (LUs);

5 a second switch, having one or more physical devices in communication with it and one or more initiators in communication with it, wherein each physical device includes one or more LUs;

10 the first switch including a description of a first virtual target, the first virtual target formed using the LUs of one or more physical devices in communication with the first switch;

the second switch including a description of a second virtual target, the second virtual target formed using the LUs of one or more physical devices in communication with the second switch;

15 the first switch including a description of a user domain, wherein the user domain includes both the first virtual target and the second virtual target.

43. The storage network of claim 42, wherein:

the second switch includes a description of an initiator connection from the first switch to the second switch.

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44. A machine readable media having instructions stored thereon, which when executed by a switch in a storage network perform the steps of:

25 automatically obtaining information about performance characteristics of a plurality of physical devices in communication with the switch, wherein each physical device includes one or more logical units (LUs);

based on the performance characteristics of each physical device, classifying the respective LUs according to a respective one of a plurality of policies and assigning the respective LUs for each respective physical device to a respective one of a plurality of storage pools;

provisioning a virtual target using the LUs assigned to a selected storage pool.

5       45. The machine readable media of claim 44, wherein the instruction for performing the step of provisioning includes provisioning the virtual target in accordance with user-selected criteria.

10       46. The machine readable media of claim 44, further including instructions for performing the step of:  
storing an LU object in the switch for each LU, wherein the LU object includes information about the LU.

15       47. The machine readable media of claim 44, wherein each respective storage pool is defined by a listing of the respective LUs assigned to it.

20       48. The machine readable media of claim 44, wherein each respective storage pool is defined by a respective policy and wherein the respective policy encompasses the performance characteristics of the LUs assigned to the respective storage pool.

25       49. The machine readable media of claim 44, further including instructions for automatically discovering each of the plurality of physical devices when each physical device is placed in communication with the switch.

50. The machine readable media of claim 44, further including instructions for associating the virtual target with a user domain.